

REMARKS

Claims 1-19 are pending for examination.

Applicant requests that the Examiner address the following issue regarding the Notice of References Cited. This issue was raised in applicant's prior responses, but was not addressed by the Examiner:

Notice of References Cited

Listed reference N in the Notice of References Cited that accompanied the Office action of July 24, 2009 is EP555886 (Kuwata). The country associated with this reference appears to be incorrectly listed on the Notice of References Cited. In particular, it appears the country should be listed as Europe (not Japan).

Also, U.S. Patent No. 6,365,925 (Hase), which is cited in the Office action of November 29, 2010 against some of the claims, does not appear to be listed on the Notice of References Cited.

Applicant respectfully requests that a corrected or supplemental Notice of References Cited be provided to applicant to list EP555886 (Kuwata) and US 6,365,925 (Hase).

Rejections under 35 U.S.C. §112, par. 2

Claims 5-6 were rejected as indefinite under 35 U.S.C. §112, par. 2. The claims are amended by replacing the phrase "first conductivity type semiconductor layer" with "first conductivity type first semiconductor layer" and by replacing the phrase "another first conductivity type semiconductor layer" with "first conductivity type second semiconductor layer." In view of the amendments, the rejections under section 112, par. 2 should be withdrawn.

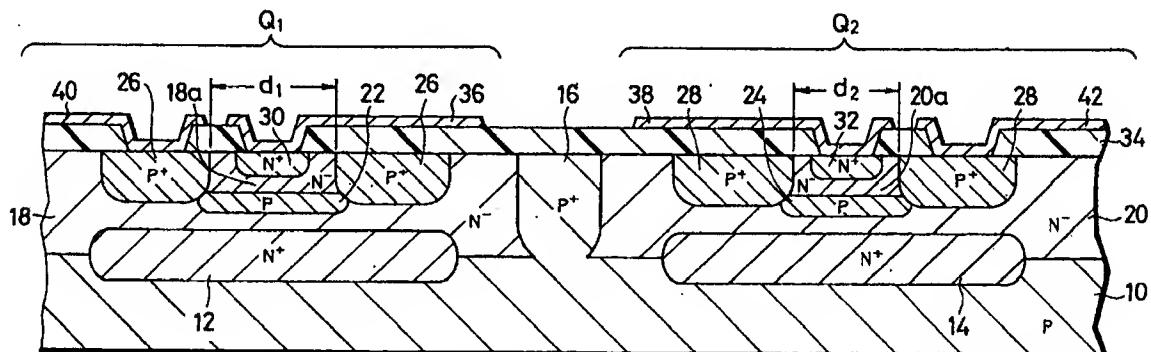
Rejections under 35 U.S.C. §§102-103

Claims 10, 12 and 19

Claims 10, 12 and 19 were rejected under 35 U.S.C. §102(b) as anticipated by U.S. Patent No. 4,807,011 (Nonaka). Reconsideration is requested.

Independent claim 10 recites a buffer layer “on” a channel region in a first conductivity type first semiconductor layer. An example is illustrated in FIG. 1, which shows buffer layer 3 on the channel regions under the p+ regions 4a, 4b. (See Specification at page 10, lines 17-18).

In contrast, Nonaka discloses a semiconductor IC circuit in which the high-resistivity region 22 (which the Office alleges corresponds to the claimed “buffer layer”) is arranged below the channel region 18a (*see* FIG. 3, reproduced below).



Therefore, Nonaka fails to disclose a buffer layer “on the channel region” as recited in claim 10. At least for this reason, the rejections of claims 10, 12 and 19 should be withdrawn.

Claims 1, 2, 4 and 18

Claims 1, 2, 4 and 18 were rejected under 35 U.S.C. §103(a) as obvious from U.S. Patent No. 5,161,235 (Shur) in view of U.S. Patent No. 6,365,925 (Hase). Reconsideration is requested.

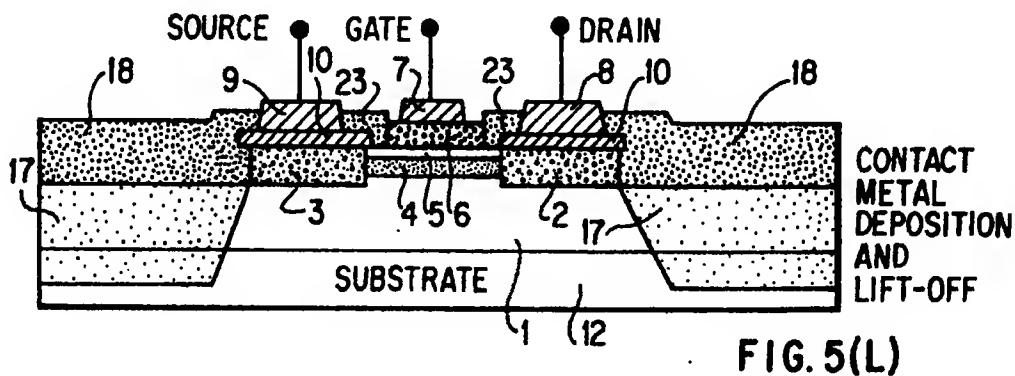
Independent claim 1 recites that a second conductivity type doped region extends into the first conductivity type first semiconductor layer to a top surface of the buffer layer, but does not extend through the buffer layer. An example is illustrated in FIG. 1 of the pending application which shows that the second conductivity type doped regions 4a, 4b extend into the first conductivity type semiconductor layer 1 to the top surface of the buffer layer 3. The regions 4a, 4b do not, however, extend through the buffer layer 3. The claimed feature(s) can provide various advantages such as those discussed in the specification at page 11, line 13 – page 12, line 17 and at page 14, line 5 – page 15, line 9.

Shur discloses a FET designed to increase barrier height and reduce turn-on threshold (title; abstract; col. 3, lines 38-64). The Office acknowledges that Shur fails to disclose a second conductivity type doped region extending into the first conductivity type first semiconductor layer. The Office argues, however, that Hase discloses this feature and that it would have been obvious to modify Shur in view of Hase to obtain the claimed subject matter.

Applicant disagrees for at least the following reasons. First, a person of ordinary skill would not have had a reason to combine the references as argued by the Office because they address completely different problems. In particular, the goal of Shur is to increase barrier height and reduce turn-on threshold (title; abstract; col. 3, lines 38-64). In contrast, the object of Hase is to provide a semiconductor device (e.g., a power amplifier) easily operable with a single positive voltage supply (see, e.g., col. 3, lines 6-7). In view of these very different, unrelated goals, a person of ordinary skill would have had no reason to modify the disclosure of Shur in view of the disclosure of Hase.

Second, even if there were some reason to modify Shur in view of Hase, at most that might have led a person of ordinary skill to extend Shur's gate 6 (which the Office alleges corresponds to the claimed "second conductivity type doped region") into the quantum well

region 4 (which the Office alleges corresponds to the claimed “first conductivity type first semiconductor layer”). For ease of reference, FIG. 5(L) of Shur is reproduced below.



However, even assuming there were some reason to extend Shur's gate 6 into the quantum well region 4 (which applicant does not concede), that would not have resulted in, or rendered obvious, the subject matter of claim 1. In particular, if Shur's gate 6 were extended into the quantum well region 4, then the gate 6 would extend through the barrier layer 5 (which the Office alleges corresponds to the claimed “buffer layer”). Thus, the combination of Shur and Hase would not have rendered obvious the claimed subject matter including “a second conductivity type doped region extending into the first conductivity type first semiconductor layer to a top surface of the buffer layer, but not extending through the buffer layer.”

Third, the low resistivity region 15c shown in FIG. 5 of Hase has a completely different function from the buffer layer described in the present application. Hase's low resistivity region 15c prevents the generation of a capacitive resistance in the channel region. In contrast, the buffer layer 3 illustrated in FIG. 1 of the present application is in contact with the second conductivity type doped regions 4a, 4b under the gate electrode 11a, 11b, which can help suppress the influence of the impurity concentration distribution of the doped regions 4a, 4b on the threshold voltage of the underlying channel region 1. Therefore, the present invention addresses a completely different problem and provides a very different solution from Hase, thereby supporting the nonobviousness of the claimed subject matter.

At least for the foregoing reasons, the rejections of claim 1, as well as claims 2, 4 and 18, should be withdrawn.

Claims 3 and 5-9

- Claims 3, 5-7 and 9 were rejected under 35 U.S.C. §103(a) as obvious from Shur in view of Hase and further in view of U.S. Patent Publication No. 2003/0075719 (Sriram).
- Claim 8 was rejected under 35 U.S.C. §103(a) as obvious from Shur in view of Hase and Sriram and further in view of U.S. Patent Publication No. 2005/0139859 (Kumar I).

Claims 3 and 5-9 depend, directly or indirectly, from claim 1. None of the other references, including Sriram and Kumar I, disclose the features missing from Nonaka discussed above, and there would have been no reason to modify Nonaka in view of any of these references to obtain the claimed subject matter. Therefore, the rejections of claims 3 and 5-9 should be withdrawn.

Claims 11 and 13-17

- Claims 11 and 15-16 were rejected under 35 U.S.C. §103(a) as obvious from Nonaka in view of U.S. Patent No. 6,841,812 (Zhao).
- Claims 13 and 14 were rejected under 35 U.S.C. §103(a) as obvious from Nonaka in view of U.S. Patent Publication No. 2002/0139992 (Kumar II).
- Claim 17 was rejected under 35 U.S.C. §103(a) as obvious from Nonaka in view of Zhao and Sriram.

Claims 11 and 13-17 depend, directly or indirectly, from claim 10. None of the other references, including Sriram, Kumar II and Zhao, disclose the features missing from the combination of Shur and Hase discussed above, and there would have been no reason to modify

Shur and Hase in view of any of these references to obtain the claimed subject matter.
Therefore, the rejections of claims 11 and 13-17 should be withdrawn.

Conclusion

It is believed that all of the pending claims have been addressed. However, the absence of a reply to a specific rejection, issue or comment does not signify agreement with or concession of that rejection, issue or comment. In addition, because the arguments made above may not be exhaustive, there may be reasons for patentability of any or all pending claims (or other claims) that have not been expressed. Finally, nothing in this paper should be construed as an intent to concede any issue with regard to any claim, except as specifically stated in this paper, and the amendment of any claim does not necessarily signify concession of unpatentability of the claim prior to its amendment.

Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 2/24/11



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